

The following is a MARKED version of the amended pending claims, specification, and Abstract with all changes shown in conventional comparison.

IN THE SPECIFICATION:

Please amend the application as indicated below.

Page 1:

Please replace the first paragraph as follows:

[Description] FIELD OF THE INVENTION

This invention concerns a procedure for the replicative fabrication and packaging of at least one microstructured molded part in form of one magazine/molded part composite and a magazine with at least one microstructured molded part presented as magazine/molded part composite.

Page 1:

Please replace the second full paragraph as follows:

BACKGROUND OF THE INVENTION

In plastic technology molded parts usually are produced in large numbers using an injection molding process and microtechnically fabricated mold inserts, whereupon they are forwarded in bulk for mounting. This process also is used for mounting microstructured molded parts, called microcomponents in the following, whereby the mounting tolerances of the microcomponents are significantly smaller due to the microstructures in comparison to molded parts without microstructures.

Page 3:

Please replace the first full paragraph as follows:

SUMMARY OF THE INVENTION

The object of the invention is to specify a magazine with microstructured molded parts and a procedure for the fabrication and packaging of microstructured molded parts, whereby the position of the microstructured molded parts to each other that is established during replicative fabrication of the molded parts will be maintained in the invented magazine during handling, transportation and mounting of the molded parts, and whereby all disadvantages described above will be eliminated.

Page 14:

Please replace the first sentence as follows:

[Content of Figures:] BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 a) Top view, and b) cross-section of a microstructured component.

Page 15:

Please insert the following between the second and third paragraphs:

Figures 15 to 19 show a tool for replicative fabrication of a magazine/molded part composite in various process steps according to Patent Claim 2, and

Figures 20 to 23 show a tool for replicative fabrication of a magazine/molded part composite in various process steps according to Patent Claims 12 and 13.

Please replace the third paragraph on Page 15 as follows:

DETAILED DESCRIPTION OF THE INVENTION

Figure 1 shows a first design example of a microcomponent (1, 10) fabricated with the invented replicative procedure. This microcomponent (1, 10) has a rectangle shape with side surfaces (18 and 18') and consists of two functional parts (1a and 1b), an unstructured bottom part (1a) and a microstructured face (1b). The face (1b) contains four equally spaced microstructures (14) in form of sinks (1c-f). According to figure 1b, the side surfaces of the bottom part (1a) are referenced as 18a, 18a' and the face surfaces (1b) are referenced as 18b, 18b'.

Page 26:

Please insert after the second paragraph, the following:

The procedure according to Patent Claim 2 is depicted in Figures 15 to 19.
The injection molding tool (5) consists of one first tool half (5a) and one
second tool half (5b), which are shown in their open position in figure 15.
The first tool half (5a) includes ejector pins (11a to 11e) and mold mounts
(7d). The second tool half (5b) includes sprue-side mold mounts (7c) with
sprue channels (29) and gate (29a).

Figure 16 shows the injection molding tool in its closed position. Mold
material is injected through the sprue channels (29) to fabricate the
magazine (12) in the mold mounts (7c and 7d). In figure 17, the injection
molding tool is opened, whereby the magazine (12) remains in the first tool
half (5a). The second tool half (5b) is replaced with another tool half (5c)
which contains sprue-side mold mounts (7b). In figure 18 the molding tool
is closed again and plastic material is injected through the sprue channels
(9) to injection mold the microcomponents (1, 10). The microcomponents
(1, 10) are inside the magazine (12) and are enclosed by the magazine (12).

Figure 19 shows the demolding process, whereby the magazine with the microcomponents (1, 10) is ejected by the ejector pins (11a to 11e).

Page 27:

Please insert after the first full paragraph, the following:

The procedure according to Patent Claims 12 and 13 is depicted in figures 20 to 23. The prefabricated magazine (12') is inserted into an additional injection molding tool (6) consisting of two tool halves (6a and 6b). The same reference numbers indicate the same components in this drawing. After closing the injection molding tool, the microcomponents (1, 10) are injection molded by introducing the mold material through the sprue channels as shown in figures 21 and 22. Then the ejectors (11a to 11e) eject the magazine/molded part composite (15') as shown in figure 23.

Page 28:

Please insert between lines 14 and 15

7d mount

Please correct line 20 as follows:

[9]10 microcomponent

IN THE CLAIMS:

This amendment is based upon the claims as amended in the enclosed Preliminary Examination Report.

Please substitute the following claims for the pending claim of the same number.

1. (Amended) A procedure for the replicative fabrication and packaging of at least one microstructured molded part in form of one magazine/molded part composite,
[characterized by] comprising the following process steps:
 - a. Replicatively [fabrication of] fabricating at least one microstructured molded part [(1, 3, 10)] using an initially closed tool [(4)] which [consists of] comprises at least one first and one second tool half [(4a, 4b)];
 - b. Opening [of] both tool halves [(4a, 4b)], whereby the molded part [(1, 3, 10)] remains in the first tool half [(4a)];
 - c. Replacing at least the second tool half [(4b)] with at least one additional tool half [(4c)];
 - d. Replicatively [fabrication of] fabricating the magazine [(12)] using the first tool half [(4a)] which contains the molded part [(1, 3, 10)] and the additional tool half [(4c)];
 - e. Simultaneously demolding [of] the magazine [(12)] and the molded part [(1, 3, 10)] as one magazine/molded part composite [(15)].
2. (Amended) A procedure for the replicative fabrication and packaging of at least one microstructured molded part as one magazine/molded part composite,
[characterized by] comprising the following process steps:

- a. Replicatively [fabrication of] fabricating the magazine [(12)] using an initially closed tool [(5)] which [consists of] comprises at least one first and one second tool half [(5a, 5b)];
 - b. Opening [of] both tool halves [(5a, 5b)], whereby the magazine [(12)] remains in the first tool half [(5a)];
 - c. Replacing at least the second tool half [(5b)] with at least one additional tool half [(5c)];
 - d. Replicatively [fabrication of] fabricating at least one microstructured molded part [(1, 3, 10)] using the first tool half [(5a)] which contains the magazine [(12)] and the additional tool half [(5c)];
 - e. Simultaneously demolding [of] the magazine [(12)] and the molded part [(1, 3, 10)] as one magazine/molded part composite [(15)].
3. (Amended) A procedure according to Claim 1 [or 2], [characterized by] wherein [using] at least one microstructured mold insert is used [(8a, 8a', 8b, 8b', 8c)] for fabrication of the magazine [(12)] and/or the molded part [(1, 3, 10)] in the tool [(4, 5)].
4. (Amended) A procedure according to [one of the claims] Claim 1 [to 3], [characterized by] wherein [fabricating] the molded part [(1, 3, 10)] and the magazine is fabricated [(12)] with different physical heights.
5. (Amended) A procedure according to [one of the Claims] Claim 1 [to 4], [characterized by] wherein [fabricating] the magazine is fabricated [(12)] with a lateral overhang [(16)] in comparison to the horizontal dimension of the molded part [(1, 3, 10)].
6. (Amended) A procedure according to [one of the Claims] Claim 1 [to 5], [characterized by] wherein [fabricating] the magazine is fabricated [(12)] with a holding contact to parts of the side surfaces [(18a, 18a',

18b, 18b', 19a, 19b, 19c)] of the molded part [(1, 3, 10)].

7. (Amended) A procedure according to [one of the Claims] Claim 1 [to 6], [characterized by] wherein [fabricating] the magazine is fabricated [(12)] with a holding contact to the microstructures [(14)] of the molded parts [(1, 3, 10)].
8. (Amended) A procedure according to [one of the Claims] Claim 1 [to 7], [characterized by] wherein [fabricating] the magazine is fabricated [(12)] with recesses [(17)].
9. (Amended) A procedure according to [one of the Claims] Claim 1 [to 8], [characterized by] wherein [fabricating] the magazine is fabricated with a holding contact to the bottom [(34)] or face surface [(35)] of the molded part [(1, 3, 10)].
10. (Amended) A procedure according to [one of the Claims] Claim 1 [to 9], [characterized by] wherein [fabricating] the magazine is fabricated with a holding contact to parts of the bottom [(34)] or parts of the face surface [(35)] of the molded part [(1, 3, 10)].
11. (Amended) A procedure according to [one of the Claims] Claim 1 [to 10], [characterized by fabricating] wherein the molded part [(1, 3, 10)] and the magazine are fabricated [(12)] with the same or with different mold materials.
12. (Amended) A procedure for the replicative fabrication and packaging of at least one microstructured molded part as one magazine/molded part composite,
[characterized by] comprising the following process steps:

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- a. Repetitively [fabrication of] fabricating at least one microstructured molded part [1, 3, 10] using a prefabricated magazine [(12')];
 - b. Simultaneously demolding [of] the magazine [(12')] and the molded parts [(1, 3, 10)] as one magazine/molded part composite [(15')].
13. (Amended) A procedure according to Claim 12, [characterized by] wherein [using] a split tool is used [(6)] which [consists of] comprises at least one first and one second tool half [(6a, 6b)].
14. (Amended) A procedure according to Claim 12 [or 13], [characterized by] wherein [using] a prefabricated magazine is used [(12')] that is a magazine (12) fabricated according to Claim 1 or 2 after removal of the microstructured molded parts [(1, 3, 10)].
15. (Amended) A magazine with at least one microstructured molded part, [which exists as] comprising: a prefabricated magazine/molded part composite [(15, 15')], [characterized by] wherein the magazine [(12, 12')] is connected [connecting] to the molded part [(1, 3, 10)] through a holding contact while leaving some open/free spaces at its side surfaces [(18a, 18a', 18b, 18b', 19a, 19b, 19c)].
16. (Amended) A magazine according to Claim 15, [characterized by] wherein the magazine [(12, 12')] [having] has a different physical height in comparison to the molded part [(1, 3, 10)].

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17. (Amended) A magazine according to [one of the Claims] Claim 15 [or 16], [characterized by] wherein the magazine [(12, 12')] [having] has a wafer form [(13)] in a standard format common for semi-conductor technology.
18. (Amended) A magazine according to [one of the Claims] Claim 15 [to 17], [characterized by] wherein the magazine [(12, 12')] [connecting] is connected to the molded part [(1, 3, 10)] at its microstructures [(14)].
19. (Amended) A magazine according to [one of the Claims] Claim 15 [to 18], [characterized by] wherein the magazine [(12, 12')] [adjoining] adopts the side surfaces [(18a, 18b, 18c, 19a, 19b, 19c)] of the molded part [(1, 3, 10)] has at least one recess [(17)].
20. (Amended) A magazine according to [one of the Claims] Claim 15 [to 19], [characterized by] wherein the magazine [(12, 12')] [connecting] is connected across the entire bottom [(34)] or face surface [(35)] of the molded part [(1, 3, 10)].
21. (Amended) A magazine according to [one of the Claims] Claim 15 [to 19], [characterized by] wherein the magazine [(12, 12')] [connecting] is connected to parts of the bottom [(34)] or parts of the face surface [(35)] of the molded part [(1, 3, 10)].
22. (Amended) A magazine according to [one of the Claims] Claim 15 [to 21], [characterized by] wherein the magazine [(12)] and the molded part [(1, 3, 10)] [being] are fabricated replicatively [according to the type of procedure in Claim 1 or 2].

23. (Amended) A magazine according to [one of the Claims] Claim 15 [to 22], [characterized by] wherein the magazine [(12, 12')] [being] is reusable as prefabricated magazine after removal of the microcomponents [(1, 3, 10) in the procedure according to Claim 12].
24. (Amended) A magazine according to [one of the Claims] Claim 15 [to 23], [characterized by] wherein the magazine [(12, 12')] [connecting] is connected to several equally spaced molded parts [(1, 3, 10)].

IN THE ABSTRACT:

Please replace the original Abstract with the following Abstract:

[Summary] ABSTRACT

This describes a procedure for replicative fabrication and packaging of at least one microstructured molded part as one magazine/molded part composite as well as a magazine with at least one microstructured molded part as one magazine/molded part composite. The first step covers fabrication of at least one microstructured molded part using an initially closed tool which consists of at least one first and one second tool half. In the second step, both tool halves are opened, whereby the molded part remains in the first tool half. In the third step, at least the second tool half is replaced with at least one additional tool half. In the fourth step, the replicative fabrication of the magazine is carried out using the first tool half containing the molded part and the additional tool half. Finally in the fifth

step, magazine and molded part are demolded simultaneously as one magazine/molded part composite. Under the invention, either the magazine or the microcomponents can be fabricated first depending on the final design of the microcomponent and magazine. This procedure, which preferably uses a 2-component injection molding process, allows the direct fabrication of several molded parts or microcomponents and their magazine packaging as one magazine/molded part composite without any after-treatment requirement, whereby different physical heights are fabricated for the magazine and microcomponents. Since the magazine connects the microcomponents only at parts of the side, bottom or face surfaces, a gripper can be used for very precise, fully automated mounting of the microcomponent.

[Figure 6]

IN THE FIGURES:

Please add the additional figure sheets, i.e. Figures 15-23 (attached), to the application.

Respectfully submitted,

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